



WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

Docket No. 50-397

May 15, 1991

Go2-91-0101

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: NUCLEAR PLANT NO. 2
LICENSEE EVENT REPORT NO. 90-025-01

Dear Sir:

Transmitted herewith is Licensee Event Report No. 90-025 Revision 1 for the WNP-2 Plant. This report is submitted in response to the report requirements of 10CFR50.73 and discusses the items of reportability, corrective action taken, and action taken to preclude recurrence.

This supplement provides final root cause information.

Very truly yours,

J. W. Baker
J. W. Baker (M/D 927M)
WNP-2 Plant Manager

JWB:lg

Enclosure:
Licensee Event Report No. 90-025-01

cc: Mr. John B. Martin, NRC - Region V
Mr. C. Sorensen, NRC Resident Inspector (M/D 901A)
INPO Records Center - Atlanta, GA
Mr. D. L. Williams, BPA (M/D 399)
NRC Resident Inspector - walk over copy

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (0150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Washington Nuclear Plant - Unit 2

DOCKET NUMBER (2)

0 5 0 0 0 3 9 7 1 OF 0 4

PAGE (3)

TITLE (4)

Inoperability of the High Pressure Core Spray System Caused by Equipment Failure

EVENT DATE (5)			LER NUMBER (6)		REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)							
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)					
1	0	23	90	9	0	0	2	5	01	05	15	9	1		0 5 0 0 0 0
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)													
1		20.402(b) 20.405(c) 50.734(i)(2)(i) 73.711(i)													
POWER LEVEL (10)		1,000 50.88(i)(1) 50.734(i)(2)(ii) 73.711(i)													
		20.405(k)(1)(i) 50.36(i)(2) 50.734(i)(2)(iii) OTHER (Specify in Abstract below and in Text, NRC Form 306A)													
		20.405(k)(1)(ii) 50.734(i)(2)(iv) 50.734(i)(2)(iv)(A) 50.734(i)(2)(iv)(B)													
		20.405(k)(1)(iii) 50.734(i)(2)(v) 50.734(i)(2)(v)													
		20.405(k)(1)(iv) 50.734(i)(2)(vi) 50.734(i)(2)(vi)													

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
AREA CODE	
M. P. Reis, Compliance Engineer	5 0 1 9 3 7 1 7 - 1 2 3 8 1 5

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
X	B/G	V	A 3 9 1	YES					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X					

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-spaced typewritten lines) (16)

At 0327 hours on October 23, 1990, during performance of the High Pressure Core Spray (HPCS) system operability surveillance test the Test Return Valve to the Suppression Pool (HPCS-V-23) failed to go full shut. The valve light indicated full closed but the Minimum Flow Valve (HPCS-V-12) did not open and the flow indication did not go to zero. The potential for diversion of system flow from in-vessel spray to the suppression pool led to declaring the HPCS system inoperable, which is a reportable event.

At 0514 hours Plant operators took action to close the manual block valve for the test return line (HPCS-V-64). This action isolated the faulty valve and would prevent the diversion of system flow.

A root cause analysis confirmed that HPCS-V-23 did not fully close, during system testing, due to premature torque switch actuation.

HPCS-V-23 thrust has been re-calculated and torque switches reset to ensure proper closure. Design practices will be revised to identify valves with similar Test vs. Design differential pressure conditions. Thrust calculations will be revised as necessary.

This event posed no threat to the health and safety of the public or plant personnel.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7 9 0	—	0 2 5	—	0 1 0 2	OF 0 4

TEXT (if more space is required, use additional NRC Form 366A's) (17)

Plant Conditions

- a) Plant Mode - 1 (Power Operation)
- b) Power Level - 100%

Event Description

At 0327 hours on October 23, 1990, during performance of the High Pressure Core Spray (HPCS) system operability surveillance test (PPM 7.4.5.1.11), the Test Return Valve to the Suppression Pool (HPCS-V-23) failed to go full shut. This test was being performed by Licensed Plant Operators and involved the closure of HPCS-V-23 against full discharge pressure of the HPCS Pump (HPCS-P-1). The valve light indicated full closed but the HPCS Minimum Flow Valve (HPCS-V-12) did not come open and the flow indication did not go to zero. This condition could cause the undesired diversion of system flow from in-vessel spray which is the primary function of the system. The uncertainty of performance of HPCS-V-23 makes the HPCS system inoperable which is a reportable event.

Immediate Corrective Action

At 0514 hours Plant operators took action to close the manual block valve for the test return line (HPCS-V-64). This action isolated the faulty valve and would prevent the diversion of system flow. The HPCS Operability Surveillance was completed at 0809 hours on October 23, 1990 thereby confirming system operability.

Further Evaluation and Corrective ActionA. Further Evaluation

1. This event is being reported per the requirement of 10CFR50.73(a)(2)(v) as a "condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to: (A) Shut down the reactor and maintain it in a safe shutdown condition; (B) Remove residual heat; (C) Control the release of radioactive material; or (D) Mitigate the consequences of an accident." The inoperability of the HPCS system is a unique event at WNP-2. Unlike the other Emergency Core Cooling Systems, HPCS system inoperability is reportable even though all requirements of technical specification LCO action statements are being complied with. This is so because it is a "single train" Emergency Core Cooling System and, as such, is reportable any time it is unable to perform its safety function when it is required to be able to do so by Plant conditions.
2. This requirement was not recognized immediately but after further management review it was reported via the Emergency Notification System (ENS) at 0810 hours on October 23 in accordance with 50.72(b)(2)(iii).

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 1 7 9 1 0 -- 0 2 5 -- 0 1 0 1 3	OF	0	4		

TEXT (If more space is required, use additional NRC Form 366A's) (17)

3. Initially the cause of this event was believed to be equipment failure associated with HPCS-V-23. The valve was not able to completely close when the line was pressurized to prevent the undesired diversion of system flow.
4. After the event, a root cause analysis was performed. A Motor Operated Valve Analysis and Test System (MOVATS) diagnostic test of HPCS-V-23 under dynamic conditions confirmed that the valve did not close fully due to the premature torque switch actuation. Investigation revealed that the test conditions are more severe than the design requirements. It was determined the root cause of the event was the less than adequate design specification, in that the calculation which determines the minimum required thrust for HPCS-V-23 did not consider differential pressure at surveillance test conditions.

B. Further Corrective Action

1. Further tests to investigate reasons for inoperability of HPCS-V-23 were conducted under controlled conditions. Prior to that time, the valve was red tagged in the closed position and HPCS-V-64 remained closed.
2. HPCS-V-23 Thrust calculations were revised and torque switches reset to ensure proper closure under both test and accident conditions.
3. A note was added to the MOV Master Data Sheet for HPCS-V-23 to state "This valve is routinely tested at higher differential pressure than the design differential pressure."
4. The HPCS operability surveillance procedure will be revised to verify HPCS-V-12 opens when HPCS-V-23 closes and to record the flow rate when HPCS-V-23 is stroked closed against differential pressure.
5. The plant policy will be reviewed to identify improvements in the process of identifying reportable events including the inoperability of "single train" safety systems.
6. Valve thrust calculations based on test data will be reviewed to determine if operational or testing differential pressures exceed design basis assumptions.
7. The design differential pressure calculation process will be revised to require valves be identified, whose surveillance conditions are more severe than their design differential pressure conditions.

Safety Significance

There is no safety significance associated with this event. The failure of the HPCS system is within the bounds of the ECCS single failure analyses. At all times the ECCS could have performed its safety function in response to a DBA since the Automatic Depressurization System (ADS) and Low Pressure Coolant Injection (LPCI) systems were operational.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Washington Nuclear Plant - Unit 2	0 5 0 0 0 3 9 7 9 0 - 0 2 5 - 0 1 0 4 OF 0 4					

TEXT (If more space is required, use additional NRC Form 366A's) (1)

The HPCS System Operability Test is performed on a quarterly basis. During this test HPCS-V-23 is opened and closed against the running pump for only a short period of time. Thus, the probability of system inoperability due to the valve not closing against system pressure is quite small. In addition, the HPCS test data collected during the surveillance indicates the system was not completely degraded. The flow through HPCS-V-23 after it closed against the running pump was approximately 1400 gpm at a pump discharge pressure of 1350 psig. With HPCS-V-23 open the flow was measured at approximately 7000 gpm at a pump discharge pressure of 250 psig.

At all times during the event, the requirements of the WNP-2 Technical Specifications (Section 3.5.1) were complied with. The LCU action for this section requires ensuring the operability of the redundant ECCS Divisions 1 and 2 and the Reactor Core Isolation Cooling system while the HPCS system is inoperable (a maximum of 14 days is allowed). Since no safety significance is associated with this event, it posed no threat to the health and safety of the public or plant personnel.

Similar Events

This event is similar to the one that occurred on November 21, 1989 as reported in LER 89-043. In that case, HPCS-V-23 was found to stay approximately 10 percent open when the same operability surveillance was performed. At that time, the problem was thought to be an internal mechanical problem with the valve. During the May 1990 refueling outage the valve was disassembled and inspected (Work Request AS3203) but no significant problems were discovered. A root cause analysis was performed on the event associated with LER 89-043 and the subsequent inspection on August 31, 1990. The root cause was judged to be indeterminate. An additional root cause analysis confirmed that HPCS-V-23 did not fully close, during system testing, due to premature torque switch actuation. The investigation also revealed the valve would not close further in the earlier event since it was already fully closed. When the HPCS pump was secured and the differential pressure relaxed, HPCS-V-23 had enough applied stem thrust to mechanically fully close the valve.

EIIS InformationText ReferenceEIIS Reference

	System	Component
HPCS System	BG	--
HPCS-V-23	BG	V
HPCS-V-12	BG	V
HPCS-V-64	BG	V
HPCS-P-1	BG	P
ECCS	BM	--
ADS	BG	--
LPCI	BM	--
RCIC	BG	--